GLOBE Activities and Indigenous Knowledge

Mahasarakham University had two training courses for 150 teachers in 55 schools. The first training was done with four protocols; Atmosphere, Soil, Water and Land Cover. The second training was done with two protocols; Water and Atmosphere. All of the schools which passed the training course are in rural area. There are equipments only current thermometer, maximum and minimum thermometer, wet and dry thermometer and cloud chart. There are some set of indigenous knowledge which related with relative humidity, rain and wind speed. We plan to study this relationship. The student went to interview the senior people about the indigenous knowledge. They proved the relationship with the old data and plan to record the new data by using GLOBE protocol.

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Introduction

Mahasarakham University is a government's university which is in the Northeast of Thailand. Two staffs from Faculty of Science were train for GLOBE trainer in New Zealand in 2002. We have done 2 training courses for 67 teachers from 38 schools. All schools are in the rural area. The people who live in this area are farmers. Most of them plant rice. The people have some indigenous knowledge for making their schedule in rice farming. This knowledge does not bring to teach in school, because the teacher does not believe in that knowledge. The teachers do not understand how to use the data from GLOBE protocols and cannot relate these data with the daily life. The water quality and atmosphere are protocol which we are interested in.

The objective of this study would like to study the relationship between the indigenous knowledge for rice farming and the data from GLOBE protocols (atmosphere).

Materials and Methods

There are 2 steps for this study. The first step was done by studying about the indigenous knowledge which is related with rice farming. The informants in the village around the target school were interview. All the information was analyzed and chooses for the second step. This step was done in

The second step will be study the relationship of indigenous knowledge and atmosphere data from GLOBE protocol. The current temperature, maximum and minimum temperature, amount of rain, pH of rain, cloud type, and wind speed will be collected.

Results and Discussion

At this stage we were finish at the first step. The information from 50 informants and report of Klinhom (2002) showed that there are many methodologies to predict the weather. The weather in Northeastern Thailand is 2 seasons. The wet season is in April to September and dry season is in October to March. The average of temperature in dry season between October to January is 23.9 degree Celsius but in February to March the average temperature is 28.5 degree Celsius. The average temperature in wet season is 27.7 degree Celsius (Table 1).

Table 1 The average of temperature in Northeast of Thailand between 1971-2003

Temperature	**October-January**	**February-March**	**April-September**
Average	23.9	28.5	27.7
Maximum	30.3	35.0	32.3
Minimum	18.3	23.0	24.2

From: Thai Meteorological Department

There are 2 sets of information. The first set is the prediction of climate by using weather and the second use bio-indicator. The information from weather is as follow:

1. The people use the kite called “Sanu” as the equipment to measure wind and wind speed at night time. This kite can make noise. The people use this kite to predict the timing and amount of rain in next season (April to September). They play this kite in October to December. If the sound is smooth for the whole night, it is mean that the rain will come regular for the whole season. If the sound is not smooth, it is predict that there will have a lot of storm in rainy season. If the kite drops before 9 pm, they predict that the quantity of rain is very low. If the kite drop between 9 to 12 pm, it predicts that the quantity of rain is medium and if the kite drop at dawn, there is high quantity of rain. The people use this information for selecting the variety of rice for planting in the next season. We interview 45 people who use this data for selecting rice variety (Table 4). Every village had some people to check this event and transform this information to the people in the village.
2. If the temperature is quite low in October to March. It is mean that the rainy season is normal. If the temperatures fluctuate, they predict that the amount of rain is very low and rain fall is irregular.
3. If there is strong wind in 11^{th} month of lunar system (around October to November), there will have heavy rain in that day of 5^{th} month (around April to May) of next year (Table 2) which is the time for rice seedling. If there is strong wind in 12^{th} month (around November to December), the heavy rain is present in that day of 6^{th} month (around May to June) in next year (Table 3) which is the time for plant rice. We prove this indigenous knowledge by using the data from Thai Meteorological Department. The result showed that there is variation about 2 days (Table 2 and 3)

Table 2 The variation of the day of prediction for raining between 11^{th} month and 5^{th} month in lunar system from indigenous knowledge of people in the Northeastern Thailand.

Year	**Variation of Prediction**
1994	3
1995	2
1996	3
1997	4
1998	0
1999	0
2000	4
2001	2
2002	0
2003	*
X	2
S.D.	1.67

* The data was not complete.

Table 3 The variation of the day of prediction for raining between 12th month and 6th month in lunar system from indigenous knowledge of people in the Northeastern Thailand.

Year	Variation of Prediction
1994	5
1995	2
1996	3
1997	7
1998	3
1999	3
2000	0
2001	2
2002	1
2003	*
X	2.89
S.D.	2.09

* The data was not complete.

Table 4 The rice variety that people plant in high (heavy rain) and low (slight rain) level of water.

Quantity of Rain	Variety of Rice (Local name)	Type	Percentage of Agreement
Heavy rain	*Koa Kho 6*	Sticky rice	100.00
	Mayom	Sticky rice	88.89
	Hom Mali	Ordinary rice	86.67
	San Pa Tong	Sticky rice	82.22
	Chao Dang	Ordinary rice	64.44
	Pun Hin	Sticky rice	57.78
	Nang Nuan	Sticky rice	37.78
Slight rain	*Kho ae*	Sticky rice	64.44
	Leung Kaew	Sticky rice	60.00
	Chao Klang	Ordinary rice	55.56
	Pong Oai	Sticky rice	51.11
	Chao Khaw	Ordinary rice	48.89
	Pa Tong Ae	Sticky rice	33.33
	Koa Kho 4	Sticky rice	24.44

Note: 45 informants are the farmers who live in Kalasin Province, Thailand.

The information from bio-indicator is as follow (Klinhom, 2003);

1. The flowering of mangoes or tamarind tree. If the tree gave a lot of flower and long inflorescence, they predict that the next season will have high quantity of rain.

2. The position of some fruit such as *Baccaurea ramiflora* and *Gnetum montanum*. If the fruit present in the lower part of trunk, the prediction is that the rain come lately. If the fruit are at the top part of tree, the rain will come early of the season.

3. The character of inflorescence of *Heliotropium indicum*. If it is stretch, they predict that will have heavy rain. But if they are roll, it will be drought in the next season.

4. If the *Xylia xylocarpa* var. *kerrii* gave a lot of fruit and most of fruit are opened. The prediction is frequency of lightning and thunder during they work in the rice field.

5. The color of monitor tail's baby. Usually the villages in Northeastern Thailand are closed to public forest. The people use this forest for many purposes. The monitor is common in this forest. The tail of monitor has alternate band of white and black color. If the tip of baby monitor's tail is black, they predict that rainy season is perfect. If it is white or pale color, it will be drought.

6. The called of truncate - snouted burrowing frog (*Gyphogrossus molossus*). In dry season this frog burrow in the soil close to wetland. At the early of wet season, if they call every time that rain falls. It will have slight rain in that wet season. If the frog calls do not frequently or do not call every time with rain. They predict that the quantity of rain is high.

7. If the sky has altocumulus more than 50%, The mushroom will be present in the public forest. The villagers will go to collect these mushrooms for food.

From our discussion concluded that all of bio-indicator is related with relative humidity, temperature, quantity of rain and cloud type. The student will be assigned to collect this data by using GLOBE activities. All of these data will be analyzed in the next step. This activity will be lead teacher and student understand the important of data from GLOBE protocol.

References

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